

nian Plants of Canada," and subsequent Reports on the plants of the Lower Carboniferous and Millstone Grit formations (Geol. Survey of Canada, 1871 and 1873). In these circumstances it seems strange that the received conclusions as to their age should be termed "simple negation not supported by facts," and regarded as of no scientific value in comparison with the mere assertion of a gentleman who has no knowledge whatever of the stratigraphy of the region, and with the "authority" of Dr. Heer, who is no doubt an excellent authority on certain departments of European palaeobotany, but who has not seen the beds in question, nor, so far as I am aware, studied their fossils.

The beds referred to, like the Devonian generally in Eastern Canada, underlie unconformably the lowest Carboniferous beds, a circumstance due apparently to the extensive igneous action which closed the Devonian period in this region, giving origin to masses and dykes of intrusive granite, and disturbing and partially altering the strata of Devonian and greater age, the materials of which have contributed to the Lower Carboniferous conglomerates. There is thus no question here as to any transition between Devonian and Carboniferous, and the beds holding the plants and insects are stratigraphically pre-Carboniferous.

The Lower Carboniferous beds, succeeding to the Devonian formation, and developed to the eastward of St. John, hold the characteristic flora of the Horton series, or Lowest Carboniferous, equivalent to the Calciferous or Tweedean formation of Scotland. In succession to this we have the flora of the Millstone grit, of the true Coal-Measures, and of the Permo-Carboniferous or Lower Permian. All of these have been explored and their plants catalogued and described in my own memoirs or in the reports of the Geological Survey, and it has been fully established that the flora of the Devonian beds is characteristic and distinct from any of these sub-floras of the Carboniferous.

The plants of the Cordaite shales are not only distinguishable from those of the Carboniferous found in their vicinity, but the assemblage includes forms like *Psilophyton* and *Archaeopteris*, which are characteristic of the Devonian, and are not found in the Carboniferous elsewhere in America. In the Devonian of Northern New Brunswick some of these plants are associated with fishes of the genera *Cephalaspis*, *Pterichthys*, &c., well-known Devonian types.

For additional information as to the geological relations of the St. John plant beds and notices of new species, I may refer to my paper on "New Erian Plants," in the *Journal of the Geological Society of London*, vol. xxxvii., May, 1881. This paper Dr. Hagen had probably not seen at the time when his letter was written.

The particular fern in question, *Pecopteris serrulata* of Hartt, has been fully described, first by Prof. Hartt, and subsequently by myself, and its distinctness from *P. plumosa* pointed out.¹ The criticism of Dr. Hagen, as to its not appearing in the sectional lists, and still being called by me a common fern, is based on a mere accident, which I could easily have explained to him. The plants referred to as found in each layer in the detailed section are those originally described by me from these beds. Some species, subsequently recognised and described by Hartt, were not included in the sectional lists, and were referred to only in a note, because I had received no information from Prof. Hartt as to the particular layers in which they were found, though I knew that some of them were by no means uncommon, from the number of specimen obtained. Dr. Hagen criticises my figure of the species, but that does not affect the question, as I have compared the specimen on the slab with *Platophemera* with the original specimens in my collection. My figures, however, show fairly the general form of the frond; and there is also a magnified figure of a pinnule, showing the venation, which should enable any one to recognise the species, and with the aid of the description to distinguish it from *P. plumosa*.

With regard to the "Ursa stage" of my respected friend Dr. Heer, founded on a little known and apparently exceptional locality, I have always objected to its being made a standard of comparison for the thoroughly worked and widely distributed Devonian or Erian rocks of North America. I gave some reasons for this in a paper sent to the Geological Society of London shortly after the appearance of Dr. Heer's memoir, an abstract of which appears in the *Proceedings of the Society*. It will be sufficient to say here that the grounds on which Dr. Heer refers the Devonian of New Brunswick to the Ursa stage would apply to the Chenning, and even to the Hamilton formations of the New York series.

¹ "Acadian Geology; Report on Devonian Plants." *Canadian Naturalist*, 1881.

The great richness of the Devonian of North America in fossil plants is a very remarkable geological fact, which I regret to say has hitherto far exceeded the means available for its adequate illustration. I hope, however, to remedy this to some extent on the occasion of the meeting of the American Association in Montreal in 1882, when my whole collection of Erian plants, together with those illustrating the several stages of the Carboniferous, will be exhibited in the new Peter Redpath Museum, and will show more fully than has been hitherto possible the progress of the American flora from the Silurian to the Permian. It will be a great pleasure to me if any palaeobotanists who are sceptical as to the magnitude of the Devonian flora will avail themselves of this opportunity to judge for themselves and to form their own opinions as to the affinities and relations of the species.

McGill College, Montreal, September 2 J. W. DAWSON

Sound-producing Ants

I AM glad to see my statement in *NATURE*, vol. xxii. p. 583, verified by Mr. H. O. Forbes, from Sumatra, and now inclose a few ants of another kind that make this peculiar tapping or scratching sound, though not in the same system of taps as those before noted, and that was thus—

i.e. three taps in unison and a pause of about a second, the taps of equal duration. The ants inclosed make a series ----- that dies off and does not seem repeated unless the exciting cause again acts, when they again start in beautiful unison. How they so correctly start together in all cases of ----- or the ----- and keep each tap in time, is really wonderful. White ants make similar tapplings, but not in rhythm as far as I know, and they use it to call or warn. These little black ants cannot be heard by us unless the material they are on is sensitively sonorous. Happening to place a tumbler on a sideboard lately in the dark, I was startled to hear this ----- arise from a sugar-bowl. I repeated it, and the noise at once convinced me that it was ants. On getting a light I found a sheet of writing paper had been laid on the bowl, and was covered by them; the glass alone was useless, I found.

Asam, July 6

S. E. PEAL

[The ants sent are apparently "workers" of a species not larger than a small British *Myrmica*.—ED.]

Wasps

A COUPLE of weeks ago I found on my window-pane a large black wasp holding in its mandibles a plump spider of about an eighth of an inch in diameter. I placed the wasp under a bell-glass and set it on my desk, where I could readily watch for further developments. Finding itself in captivity, the wasp dropped its booty and spent some time in trying to find a way of escape. Coming at length to a state of rest, it espied the spider and sprang upon it with tiger-like fierceness. Seizing it and raising itself up to its full height, the wasp brought its posterior under and forward with a quick motion, and gave the spider, two or three thrusts with its sting. Assured that the spider was dead, the wasp proceeded to roll it over and over, rapidly working it up into a globular mass. This done it started to fly away; but, foiled in the attempt, it dropped the spider, which was for some time apparently forgotten. This whole operation I saw several times repeated during the two days of my observations. Being called away from home for a few days, I was curious on my return to ascertain the results of my experiment. I had taken the precaution at the first to place under the bell-glass a small dish of clean water, to which the wasp had helped itself freely. I found the wasp dead; but not the least morsel of the spider had it eaten. My conclusions are: (1) that the wasp died of starvation; (2) that the spider was intended, not for its own food, but for that of its young in their larval state. In confirmation of this I have broken open several of the finished cells of these wasps, and found them filled with pellets made of portions of spiders, flies, and worms. Only yesterday a fine opportunity was afforded me for further observations in this direction. One of my flowering vines is infested with a green worm—the larva of the yellow butterfly. I discovered a bronze- and yellow wasp standing on the edge of a leaf of this vine, holding fast to one of these worms of twice its own size. The worm was dangling in mid-air, and the wasp endeavoured laboriously for a long time to pull it up on the surface of the leaf.

Failing in this, with a dexterity worthy of the Knight of the Shears it cut the worm in two, letting about three-fourths of it fall to the ground. The remainder was then easily dragged to the surface of the leaf, where the wasp spent some fifteen minutes in cutting down, trimming, and reducing it to a globular mass of about an eighth of an inch in diameter. Then resting for a few minutes, and taking a fresh hold of its booty, it flew briskly away.

J. T. BROWNELL
Lyons, N.Y., August 13

Treatment of Hay Fever

SOME years ago Prof. Helmholtz, in a letter to you, gave an account of a remedy he had found for "hay fever." This was simply to treat the part of the nose, which seems to be the seat of the trouble, with sulphate of quinine solution by pouring it into the nose with a pipette, while lying on a sofa with the head turned upside down. Having had the most enjoyable part of summer destroyed by hay fever ever since I can remember, I have tried every remedy I have heard of, including internal doses of arsenic, and I have found them all to fail. Prof. Helmholtz's method only gives me relief for ten minutes or so, and cold water does the same. I have tried solutions of sulphate of zinc and tannin, and many other astringents, but all to no purpose. As many others knew that I was experimenting upon myself in this matter, I have had several patients trying all the remedies that I have tried, and I can therefore say with certainty that no remedy yet published will cure hay fever. I have however succeeded in finding a method which is a really effectual cure, and as I know that many are rendered miserable during the most enjoyable part of the year, I hasten to give them the benefit of the result of my inquiries. One thing which misled me was that my eyes were often very much inflamed and pained during an attack, and I often tried remedies for my eyes (which have sometimes gone wrong when I had no hay fever) when they were only affected in sympathy with my nose. I found that the only thing required was to prevent the entrance of the pollen grains into the nose. When there are not many in the air, as during or after rain, it is simply necessary to stop the nose with a spring clip. I have used a piece of brass or steel ribbon bent double, and having only sufficient spring to close the nostrils without undue pressure. This causes the patient to breathe by the mouth, but one soon gets accustomed to the inconvenience. I found that to stop the nostrils with cotton wool was far too irritating, especially as those afflicted with hay fever are so owing to the tenderness of the internal coating of the nose. When going amongst hay a further precaution must be taken, viz., plugging the ducts from the eyes. I used for this purpose dumb-bell shaped pieces of glass, which are easily slipped into the ducts, and can be removed when wanted. Thus protected, any one who is troubled by hay fever can go into the camp of the enemy and stir up hay in a field with as much impunity as one not troubled with this "sixth sense." The season for hay fever is nearly passed now, but I hope that the publication of this note will be the cause of relief to many during next summer, and on that plea I ask its publication in your valuable journal, and I hope that medical men in the South of England, where hay fever is common, will give it a trial and report upon it next summer. In Scotland hay fever is practically unknown.

J. B. HANNAY

Cove Castle, Loch Long, N.B.

Red Rainbows

PROF. S. P. THOMPSON's letter (p. 459) makes me recall that when on September 2 last year I crossed Wales westwardly from Hereford, on a fine sunny day, the train ran into a misty shower after 6 p.m. at Machynlleth, and out of it as we neared the viaduct at Barmouth. The sun had been obscured for some time, when it suddenly shone out through a chink between sea and cloud, causing in the east a very beautiful red rainbow. Like Prof. Thompson, I was under the impression that the phenomenon was of no uncommon occurrence, so did nothing more than note it in my diary.

HENRY MUIRHEAD

Cambuslang, September 16

Infusorial Parasites on Stickleback

ONE day in June, when examining a very small stickleback under the microscope, I was surprised to find it infested by numbers of infusoria, evidently parasitic upon it. This led me

to examine others from the same water, viz., a pond very rich in infusorial life generally, as also specimens from the river close at hand. Every specimen from the pond was similarly attacked, while none of those from the river were so. The parasite is apparently *Trichodina pediculus*, which is stated to be parasitic upon *Hydra vulgaris*. Want of literature on the subject has prevented me from following the matter up, but it seems that I have found, if not a new species, at least a new host for a known species. I shall be glad if any of the readers of NATURE can give me any information on the subject.

N. H. POOLE

Charterhouse, Godalming

Photographing Diffraction Rings—Optical Phenomenon

THE peculiar character of the photographs of an opening to the sky in the dark Cyclopean gallery at Tiryns, to which Mr. W. J. Stillman calls attention (NATURE, vol. xxiv. p. 260), finds an obvious explanation in the well-known optical phenomenon of diffraction rings, produced when a beam of light is transmitted through a small circular aperture, and viewed by means of a lens. Had your "Cecropian" correspondent examined the image of the illuminated opening by the assistance of a lens, the phenomenon of concentric coloured rings would, doubtless, have been recognisable to the eye. Hence the only point of interest in the phenomenon observed by Mr. Stillman is the significant fact that in securing the fleeting images of the rings on the gelatine plate—the actinic rays being alone effective—alternate dark and bright concentric rings are produced, as in the case of homogeneous or monochromatic light, instead of the coloured rings seen by interposing a lens between the aperture and the eye. In other terms, the impressions on the gelatine plate being due to the action of the monochromatic actinic rays, the theory of diffraction shows that the concentric rings should be alternately dark and bright. This is an important circumstance in the applications of photography to such investigations.

Berkeley, California, August 16

JOHN LE CONTE

A Primitive Diving-Bell

IN NATURE, vol. xxiv. p. 201, it is stated that Herr Budde has found a description of a primitive diving-bell in a work of Bartolini, 1674. The inventor appears to have been Franciscus Kesler, 1616. This description of Kesler's diving machine will also be found, together with representations of the same, in Schwenter's "Deliciae Physico-Mathematicae," 1636, a very rare and curious volume; so rare indeed that it is stated in *Cosmos*, January 27, 1860, "it is not to be found in the Imperial Library, nor in any of the public libraries of Paris." J. van Lennep, in *Notes and Queries*, December 15, 1859, p. 503, says "there is a Dutch translation of Schwenter, 1672; of this rare volume I fortunately possess a copy."

N. S. HEINEKEN

Sidmouth, September 11

ITTAVIO LAUDI.—Messrs. Trübner, publishers, London, might be able to help you to get copies of the Chinese translations mentioned in Mr. Fryer's articles on "Science in China."

FREDERICK CURREY, M.A., F.R.S.

THE late Frederick Currey, whose death was announced in last week's NATURE, p. 475, was born at Eltham on August 4, 1819, educated at Eton and Trinity College, Cambridge, there obtaining a scholarship, and attaining his B.A. in 1841; three years later he proceeded to M.A., and was called to the Bar, afterwards practising as conveyancer and equity draftsman.

His first public performance as a scientific writer was a translation of Schach's "Das Mikroskop" in 1853, a second edition of which was called for within two years. In the *Microscopical Journal* for 1854 he published some observations on two new fungi, and by the same channel he afterwards communicated several papers, chiefly on the obscure points in the reproduction of the lower cryptogams. The Greenwich Natural History Club was established in 1852, Mr. Currey being one of the earliest members, and the next year he read a paper on the